REMARKS

Claims 11 and 13-14 are pending. By the Office Action, claims 11 and 12 are objected to; claims 11 and 12 are rejected under 35 U.S.C. §102 or §103, and claims 13 and 14 are rejected under 35 U.S.C. §103. By this Amendment, claims 11, 13, and 14 are amended and claim 12 is canceled. Support for the amendments to claims 11, 13, and 14 can be found in claim 12 as filed. No new matter is added.

I. Claim Objection

Claims 11 and 12 are objected to for informalities. By this Amendment, claim 11 is amended as suggested by the Examiner, and claim 12 is canceled. Reconsideration and withdrawal of the objection are respectfully requested.

II. Rejection Under §102/§103

Claims 11 and 12 are rejected under 35 U.S.C. §102(b) as anticipated by, or under 35 U.S.C. §103(a) as having been obvious over, Abe. Claim 11 has been amended to incorporate the subject matter of claim 12. Applicant respectfully traverses the rejection.

Independent claim 11, as amended, is directed to a process for producing a laminate, comprising the step of thermocompression bonding a core insulating layer, a thermoplastic resin layer, which is disposed on both sides or one side (z-plane) of the core insulating layer, has an adhesive property and has a maximum value of the storage modulus of not more than 10^6 Pa at a temperature at or above Tg of the thermoplastic resin layer, and a metal layer disposed on the surface of the thermoplastic resin layer at a temperature of Tg or above of the thermoplastic resin layer under temperature conditions such that the storage modulus of the thermoplastic resin is minimum. Such a process for producing a laminate is not disclosed, taught or suggested by Abe.

Abe describes an insulating adhesive tape comprising a base supporting film and an adhesive layer formed on at least one surface thereof, the adhesive tape being formed of a

thermoplastic polymer comprising a thermoplastic polyimide. The thermoplastic polymer has a glass transition temperature ranging from 180°C to 280°C and an elastic modulus ranging from 10^{10} dyne/cm^2 to 10^{11} dyne/cm^2 at 25°C, said modulus including a value ranging from 10^2 dyne/cm^2 to 10^9 dyne/cm^2 at a temperature ranging between 250°C and 300°C. See Abe at Abstract.

Abe does not teach or suggest the claimed invention. As stated above, claim 11 requires that the thermoplastic resin layer has an adhesive property and has a maximum value of the storage modulus of not more than 10^6 Pa at a temperature at or above Tg of the thermoplastic resin layer, and that the metal layer is disposed on the surface of the thermoplastic resin layer at a temperature of Tg or above of the thermoplastic resin layer under temperature conditions such that the storage modulus of the thermoplastic resin is minimum. Although Abe teaches that the disclosed thermoplastic polymer has a glass transition temperature ranging from 180°C to 280°C and an elastic modulus including a value ranging from 10^2 dyne/cm^2 to 10^9 dyne/cm^2 at a temperature ranging between 250°C and 300°C, the claimed invention is different from the disclosure of Abe.

Applicant points out that the storage modulus of a thermoplastic resin such as thermoplastic polyimide is not linear with increasing temperature. Rather, the storage modulus of a thermoplastic resin such as thermoplastic polyimide first reduces as the temperature rises to or above the glass transition temperature Tg, but then rises as the temperature rises. The rise in the storage modulus is due to pyrolysis and/or crosslinking of the resin, which occurs under rising temperatures above Tg. In other words, a thermoplastic resin shows a minimum storage modulus at a certain temperature.

Based on the above properties of the thermoplastic resin, an objective of the claimed invention is to obtain a laminate having high adhesive strength by thermocompression under temperature conditions such that the storage modulus of the thermoplastic resin is minimum.

See specification at page 12, lines 20-28. However, Abe nowhere discloses these features of the claimed invention. Abe does not teach or suggest that a thermoplastic resin shows a minimum storage modulus at a certain temperature. Nor does Abe teach or suggest that the metal layer is disposed on the surface of the thermoplastic resin layer under temperature conditions such that the storage modulus of the thermoplastic resin is minimum. These features are nowhere taught or suggested by Abe, and Abe nowhere teaches or suggests that the disclosed process could or should be modified to practice the claimed invention.

For at least these reasons, Abe does not anticipate, and would not have rendered obvious, the claimed invention. Reconsideration and withdrawal of the rejection is respectfully requested.

III. Rejection Under §103

Claims 13 and 14 are rejected under 35 U.S.C. §103(a) as having been obvious over Abe in view of Shiotani and Ishikawa. Claims 13 and 14 are amended to incorporate the subject matter of claim 12. Applicant respectfully traverses the rejection with respect to the amended claims.

Independent claims 13 and 14 share limitations similar to independent claim 11, discussed above. Independent claim 13 is directed to a method for producing an electronic circuit comprising the steps of: providing a laminate comprising a combination of a metal layer with an insulating layer, said laminate having a layer construction of first metal layer/insulating layer/second metal layer or a layer construction of metal layer/insulating layer, the insulating layer having a multilayer structure of two or more layers, the layer on the side of the adhesive interface with the metal layer, out of the layers constituting the insulating layer, being a thermoplastic resin layer, and a maximum value of the storage modulus at a temperature at or above Tg of the thermoplastic resin layer being not more than 10^6 Pa and obtained by thermocompression under temperature conditions such that the storage modulus

of the thermoplastic resin is minimum; forming a photosensitive resin layer on a surface of the metal layer of the laminate; and patterning the thus formed photosensitive resin layer to prepare an electronic circuit. Independent claim 14 is directed to a method for producing an electronic circuit comprising the steps of: providing an insulating film comprising an insulating layer and a thermoplastic resin layer provided on at least one side of the insulating layer, the thermoplastic resin having a maximum value of the storage modulus of not more than 10^6 Pa at a temperature at or above Tg of the thermoplastic resin layer; laminating the insulating film with a metal layer to prepare a laminate by thermocompression under temperature conditions such that the storage modulus of the thermoplastic resin is minimum; forming a photosensitive resin layer on a surface of the metal layer of the laminate; and patterning the thus formed photosensitive resin layer to prepare an electronic circuit. Such methods for producing an electronic circuit are nowhere taught or suggested by the cited references, alone or in combination.

Abe is discussed in detail above. As described, Abe fails to teach or suggest at least the claim limitations that the thermoplastic resin layer has an adhesive property and has a maximum value of the storage modulus of not more than 10^6 Pa at a temperature at or above Tg of the thermoplastic resin layer, and that the metal layer is disposed on the surface of the thermoplastic resin layer at a temperature of Tg or above of the thermoplastic resin layer under temperature conditions such that the storage modulus of the thermoplastic resin is minimum. Although Abe teaches that the disclosed thermoplastic polymer has a glass transition temperature ranging from 180°C to 280°C and an elastic modulus including a value ranging from 10^2 dyne/cm^2 to 10^9 dyne/cm^2 at a temperature ranging between 250°C and 300°C, the claimed invention is different from and would not have been obvious over the disclosure of Abe. Abe does not teach or suggest that a thermoplastic resin shows a minimum storage modulus at a certain temperature. Nor does Abe teach or suggest that the

metal layer is disposed on the surface of the thermoplastic resin layer under temperature conditions such that the storage modulus of the thermoplastic resin is minimum. These features are nowhere taught or suggested by Abe, and Abe nowhere teaches or suggests that the disclosed process could or should be modified to practice the claimed invention.

Shiotani and Ishikawa fail to overcome the deficiencies of Abe. Shiotani is cited for its disclosure of a laminate useful for forming circuit boards. Ishikawa is cited for its disclosure of methods for photo etching a board. However, these references also fail to teach or suggest that a thermoplastic resin shows a minimum storage modulus at a certain temperature. Nor does either Shiotani or Ishikawa teach or suggest that the metal layer is disposed on the surface of the thermoplastic resin layer under temperature conditions such that the storage modulus of the thermoplastic resin is minimum. These features are nowhere taught or suggested by any of Abe, Shiotani and Ishikawa, and none of the references teach or suggest that the disclosed processes could or should be combined and then modified to practice the claimed invention.

For at least these reasons, Abe, Shiotani and Ishikawa would not have rendered obvious the claimed invention. Reconsideration and withdrawal of the rejection is respectfully requested.

IV. Conclusion

In view of the above remarks, it is respectfully submitted that the above-identified patent application is in condition for allowance. Favorable consideration and prompt allowance are therefore respectfully requested.

Should the Examiner believe anything further would be necessary in order to place the application in condition for allowance, the Examiner is invited to contact Applicants' undersigned representative at the telephone number listed below.

Respectfully submitted,

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